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WO 01/38822 A1

(51) International Patent Classification⁷: G01B 11/00,
H03K 17/94, G01V 8/10, B23Q 17/24, B23B 49/00

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Gloucestershire GL10 2JR (GB). DAVIES, William,
Kenneth [GB/GB]; 10 Squires Leaze, Thornbury, Bristol,
South Gloucestershire BS35 1TB (GB). LEETE, Norman,
John [GB/GB]; 4 Court Garden, Uley, Gloucestershire
GL11 5AH (GB). BELL, Colin, Timothy [GB/GB]; 16
Howmead, Berkeley, Gloucestershire GL13 9AS (GB).

(21) International Application Number: PCT/GB00/04403

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Mills, Wotton-under-Edge, Gloucestershire GL12 8JR
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CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,
NL, PT, SE, TR).

(71) Applicant (for all designated States except US): REN-
ISHAW PLC [GB/GB]; New Mills, Wotton-under-Edge,
Gloucestershire GL12 8JR (GB).

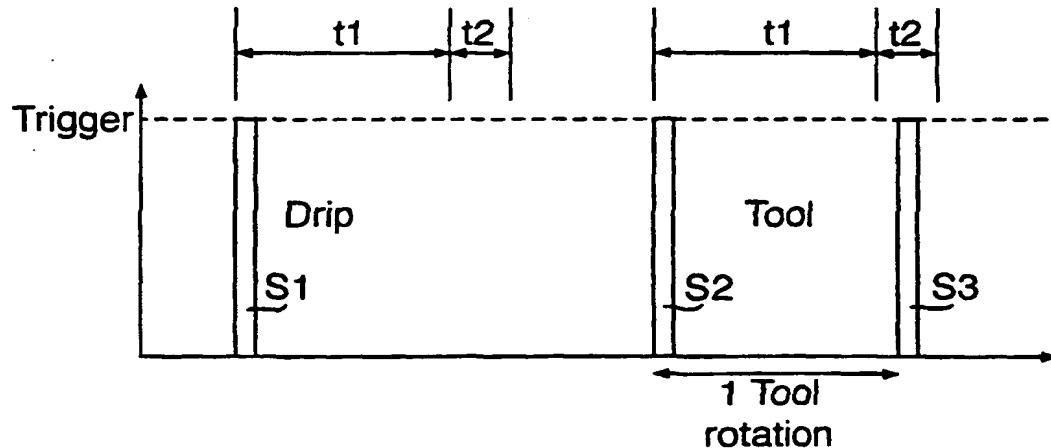
Published:

— With international search report.

(72) Inventors; and
(75) Inventors/Applicants (for US only): STIMPSON,
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Avoning, Gloucestershire GL8 8TL (GB). FUGE, Jon,

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: OPTICAL MEASURING APPARATUS FOR MEASURING OBJECTS ON MACHINES



(57) Abstract: A light source generates a beam of light which is incident on a detector which generates a trigger signal when the beam incident upon it is occluded by a tool. To avoid trigger signals being produced when the beam is temporarily occluded by coolant drips passing through the beam, the detector produces a detection signal each time the beam is occluded, but only produces a trigger signal if a further detection signal is produced in a specified time interval from the generation of an earlier detection signal. One method of generating the time interval is by rotating the tool so that the beam is occluded at time intervals (t1) each time a cutting edge of the tool enters the beam. If no second signal is generated within an interval (t2) at the end of interval (t1) no trigger signal is produced.

WO 01/38822 A1

PCT**REQUEST**

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)

483WO

Box No. I TITLE OF INVENTION

Optical Measuring Apparatus for Measuring Objects on Machines

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Renishaw plc
New Mills
Wotton-under-edge
Gloucestershire
GL12 8JR
United Kingdom

 This person is also inventor.

Telephone No.

01453 524524

Facsimile No.

01453 524901

Teleprinter No.

State (that is, country) of nationality:

United Kingdom

State (that is, country) of residence:

United Kingdom

This person is applicant all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box for the purposes of:

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Stimpson, Victor Gordon
Field House
Avening Road
Tetbury Hill
Gloucestershire
GL8 8TL United Kingdom

This person is:

 applicant only applicant and inventor inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

United Kingdom

State (that is, country) of residence:

United Kingdom

This person is applicant all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box for the purposes of:

 Further applicants and/or (further) inventors are indicated on a continuation sheet.**Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

 agent common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Waite, John et al
Renishaw plc, Patent Department
New Mills
Wotton-under-Edge
Gloucestershire, GL12 8JR
United Kingdom

Telephone No.

01453 524524

Facsimile No.

01453 524901

Teleprinter No.

Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

See Notes to the request form

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Fuge Jon Paul
5, College View
Bath Road
Stonehouse
Gloucestershire
GL10 2JR

This person is:

applicant only
 applicant and inventor
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
United Kingdom

State (that is, country) of residence:
United Kingdom

This person is applicant all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Davies, William Kenneth
10 Squires Leaze
Thornbury
Bristol
South Gloucestershire
BS35 1TB

This person is:

applicant only
 applicant and inventor
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
United Kingdom

State (that is, country) of residence:
United Kingdom

This person is applicant all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Leete, Norman John
4 Court Garden
Uley
Gloucestershire
GL11 5AH

This person is:

applicant only
 applicant and inventor
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
United Kingdom

State (that is, country) of residence:
United Kingdom

This person is applicant all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Bell, Colin Timothy
16 Howmead
Berkeley
Gloucestershire

This person is:

applicant only
 applicant and inventor
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
United Kingdom

State (that is, country) of residence:
United Kingdom

This person is applicant all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Further applicants and/or (further) inventors are indicated on another continuation sheet.

See Notes to the request form

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT

EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT

EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT

OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

<input type="checkbox"/> AE United Arab Emirates	<input type="checkbox"/> LC Saint Lucia
<input type="checkbox"/> AG Antigua and Barbuda	<input type="checkbox"/> LK Sri Lanka
<input type="checkbox"/> AL Albania	<input type="checkbox"/> LR Liberia
<input type="checkbox"/> AM Armenia	<input type="checkbox"/> LS Lesotho
<input type="checkbox"/> AT Austria	<input type="checkbox"/> LT Lithuania
<input type="checkbox"/> AU Australia	<input type="checkbox"/> LU Luxembourg
<input type="checkbox"/> AZ Azerbaijan	<input type="checkbox"/> LV Latvia
<input type="checkbox"/> BA Bosnia and Herzegovina	<input type="checkbox"/> MA Morocco
<input type="checkbox"/> BB Barbados	<input type="checkbox"/> MD Republic of Moldova
<input type="checkbox"/> BG Bulgaria	<input type="checkbox"/> MG Madagascar
<input type="checkbox"/> BR Brazil	<input type="checkbox"/> MK The former Yugoslav Republic of Macedonia
<input type="checkbox"/> BY Belarus	<input type="checkbox"/> MN Mongolia
<input type="checkbox"/> BZ Belize	<input type="checkbox"/> MW Malawi
<input type="checkbox"/> CA Canada	<input type="checkbox"/> MX Mexico
<input type="checkbox"/> CH and LI Switzerland and Liechtenstein	<input type="checkbox"/> MZ Mozambique
<input checked="" type="checkbox"/> CN China	<input type="checkbox"/> NO Norway
<input type="checkbox"/> CR Costa Rica	<input type="checkbox"/> NZ New Zealand
<input type="checkbox"/> CU Cuba	<input type="checkbox"/> PL Poland
<input type="checkbox"/> CZ Czech Republic	<input type="checkbox"/> PT Portugal
<input type="checkbox"/> DE Germany	<input type="checkbox"/> RO Romania
<input type="checkbox"/> DK Denmark	<input type="checkbox"/> RU Russian Federation
<input type="checkbox"/> DM Dominica	<input type="checkbox"/> SD Sudan
<input type="checkbox"/> DZ Algeria	<input type="checkbox"/> SE Sweden
<input type="checkbox"/> EE Estonia	<input type="checkbox"/> SG Singapore
<input type="checkbox"/> ES Spain	<input type="checkbox"/> SI Slovenia
<input type="checkbox"/> FI Finland	<input type="checkbox"/> SK Slovakia
<input type="checkbox"/> GB United Kingdom	<input type="checkbox"/> SL Sierra Leone
<input type="checkbox"/> GD Grenada	<input type="checkbox"/> TJ Tajikistan
<input type="checkbox"/> GE Georgia	<input type="checkbox"/> TM Turkmenistan
<input type="checkbox"/> GH Ghana	<input type="checkbox"/> TR Turkey
<input type="checkbox"/> GM Gambia	<input type="checkbox"/> TT Trinidad and Tobago
<input type="checkbox"/> HR Croatia	<input type="checkbox"/> TZ United Republic of Tanzania
<input type="checkbox"/> HU Hungary	<input type="checkbox"/> UA Ukraine
<input type="checkbox"/> ID Indonesia	<input type="checkbox"/> UG Uganda
<input type="checkbox"/> IL Israel	<input checked="" type="checkbox"/> US United States of America
<input type="checkbox"/> IN India	<input type="checkbox"/> UZ Uzbekistan
<input type="checkbox"/> IS Iceland	<input type="checkbox"/> VN Viet Nam
<input checked="" type="checkbox"/> JP Japan	<input type="checkbox"/> YU Yugoslavia
<input type="checkbox"/> KE Kenya	<input type="checkbox"/> ZA South Africa
<input type="checkbox"/> KG Kyrgyzstan	<input type="checkbox"/> ZW Zimbabwe
<input type="checkbox"/> KP Democratic People's Republic of Korea	
<input checked="" type="checkbox"/> KR Republic of Korea	
<input type="checkbox"/> KZ Kazakhstan	

Check-box reserved for designating States which have become party to the PCT after issuance of this sheet:

.....

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 22 November 1999	9927471.4	United Kingdom		
item (2) 25 August 2000	0020929.6	United Kingdom		
item (3)				

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):

1 and 2

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA)
(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA /

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year) Number Country (or regional Office)

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request	: 4
description (excluding sequence listing part)	: 11
claims	: 3
abstract	: 1
drawings	: 3
sequence listing part of description	: 0

Total number of sheets : 22

This international application is accompanied by the item(s) marked below:

1. fee calculation sheet
2. separate signed power of attorney
3. copy of general power of attorney; reference number, if any:
4. statement explaining lack of signature
5. priority document(s) identified in Box No. VI as item(s):
6. translation of international application into (language):
7. separate indications concerning deposited microorganism or other biological material
8. nucleotide and/or amino acid sequence listing in computer readable form
9. other (specify): Form 23/77 (x2)

Figure of the drawings which should accompany the abstract:

Fig 2

Language of filing of the international application:

English

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

For and on behalf of the Applicants

..... *J. Waite*

J. Waite (Agent)

For receiving Office use only

1. Date of actual receipt of the purported international application:	2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:	
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.	
5. International Searching Authority (if two or more are competent): ISA /		

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

See Notes to the request form

INTERNATIONAL SEARCH REPORT

International Application No
/GB 00/04403

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01B11/00 H03K17/94 G01V8/10 B23Q17/24 B23B49/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G01B H03K G01V B23Q B23B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 39 05 949 A (SCHULZ HERBERT PROF DR ING ;MOOTZ ANDREAS DIPL ING (DE)) 30 August 1990 (1990-08-30) column 5, line 3-13, 49-56; figures ---	1-3,9,10
X	EP 0 511 117 A (NIPPON TELEGRAPH & TELEPHONE) 28 October 1992 (1992-10-28) claim 1 ---	1
A	US 4 502 823 A (CARLSON JEFFREY J ET AL) 5 March 1985 (1985-03-05) the whole document ---	1-10
A	DE 43 23 910 A (LEUZE ELECTRONIC GMBH & CO) 19 January 1995 (1995-01-19) abstract; figure 3 ---	1 -/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

2 March 2001

Date of mailing of the international search report

13/03/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Westhues, T

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/04403

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 772 523 A (MONTANVERT M ET AL) 13 November 1973 (1973-11-13) column 5, line 21-43; figure 4 ---	1
A	EP 0 584 510 A (LEUZE ELECTRONIC GMBH & CO) 2 March 1994 (1994-03-02) abstract; claims 1,4; figure 3 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/04403

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 3905949	A	30-08-1990	WO	9010192 A	07-09-1990
EP 0511117	A	28-10-1992	JP	3051199 B	12-06-2000
			JP	4328408 A	17-11-1992
			JP	3098830 B	16-10-2000
			JP	5157525 A	22-06-1993
			DE	69223544 D	29-01-1998
			DE	69223544 T	09-07-1998
			US	5739912 A	14-04-1998
US 4502823	A	05-03-1985	NONE		
DE 4323910	A	19-01-1995	NONE		
US 3772523	A	13-11-1973	FR	2123753 A	15-09-1972
			CA	997452 A	21-09-1976
			DE	2204093 A	10-08-1972
			GB	1373995 A	13-11-1974
EP 0584510	A	02-03-1994	DE	4228112 C	01-07-1993
			DE	4237311 C	16-12-1993
			DE	4319451 C	25-08-1994
			DE	59309003 D	29-10-1998

INTERNATIONAL SEARCH REPORT

I. International Application No

PCT/GB 00/04403

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01B11/00 H03K17/94 G01V8/10 B23Q17/24 B23B49/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01B H03K G01V B23Q B23B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal, PAJ

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Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 39 05 949 A (SCHULZ HERBERT PROF DR ING ;MOOTZ ANDREAS DIPL ING (DE)) 30 August 1990 (1990-08-30) column 5, line 3-13,49-56; figures ---	1-3,9,10
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A	US 4 502 823 A (CARLSON JEFFREY J ET AL) 5 March 1985 (1985-03-05) the whole document ---	1-10
A	DE 43 23 910 A (LEUZE ELECTRONIC GMBH & CO) 19 January 1995 (1995-01-19) abstract; figure 3 ---	1 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

2 March 2001

13/03/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax (+31-70) 340-3016

Authorized officer

Westhues, T

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/04403

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 772 523 A (MONTANVERT M ET AL) 13 November 1973 (1973-11-13) column 5, line 21-43; figure 4 -----	1
A	EP 0 584 510 A (LEUZE ELECTRONIC GMBH & CO) 2 March 1994 (1994-03-02) abstract; claims 1,4; figure 3 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/04403

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
DE 3905949	A 30-08-1990	WO	9010192 A	07-09-1990
EP 0511117	A 28-10-1992	JP	3051199 B	12-06-2000
		JP	4328408 A	17-11-1992
		JP	3098830 B	16-10-2000
		JP	5157525 A	22-06-1993
		DE	69223544 D	29-01-1998
		DE	69223544 T	09-07-1998
		US	5739912 A	14-04-1998
US 4502823	A 05-03-1985	NONE		
DE 4323910	A 19-01-1995	NONE		
US 3772523	A 13-11-1973	FR	2123753 A	15-09-1972
		CA	997452 A	21-09-1976
		DE	2204093 A	10-08-1972
		GB	1373995 A	13-11-1974
EP 0584510	A 02-03-1994	DE	4228112 C	01-07-1993
		DE	4237311 C	16-12-1993
		DE	4319451 C	25-08-1994
		DE	59309003 D	29-10-1998

INTERNATIONAL COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 483WO	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/04403	International filing date (day/month/year) 17/11/2000	(Earliest) Priority Date (day/month/year) 22/11/1999
Applicant RENISHAW PLC et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
 - contained in the international application in written form.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority in written form.
 - furnished subsequently to this Authority in computer readable form.
 - the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
 - the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. Certain claims were found unsearchable (See Box I).

3. Unity of invention is lacking (see Box II).

4. With regard to the title,

- the text is approved as submitted by the applicant.
- the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- the text is approved as submitted by the applicant.
- the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

- as suggested by the applicant.
- because the applicant failed to suggest a figure.
- because this figure better characterizes the invention.

2

None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 00/04403

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01B11/00 H03K17/94 G01V8/10 B23Q17/24 B23B49/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01B H03K G01V B23Q B23B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 39 05 949 A (SCHULZ HERBERT PROF DR ING ;MOOTZ ANDREAS DIPL ING (DE)) 30 August 1990 (1990-08-30) column 5, line 3-13, 49-56; figures ---	1-3, 9, 10
X	EP 0 511 117 A (NIPPON TELEGRAPH & TELEPHONE) 28 October 1992 (1992-10-28) claim 1 ---	1
A	US 4 502 823 A (CARLSON JEFFREY J ET AL) 5 March 1985 (1985-03-05) the whole document ---	1-10
A	DE 43 23 910 A (LEUZE ELECTRONIC GMBH & CO) 19 January 1995 (1995-01-19) abstract; figure 3 ---	1 -/-



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

2 March 2001

Date of mailing of the international search report

13/03/2001

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 00/04403

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 772 523 A (MONTANVERT M ET AL) 13 November 1973 (1973-11-13) column 5, line 21-43; figure 4 ---	1
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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